



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/922,815	08/06/2001	Christopher A. Michaluk	98048CON(3600-090-02)	9155

7590 12/05/2002

Martha Ann Finnegan, Esq.  
Cabot Corporation  
Billerica Technical Center  
157 Concord Road  
Billerica, MA 01821

EXAMINER

OLTMANS, ANDREW L

ART UNIT	PAPER NUMBER
----------	--------------

1742

DATE MAILED: 12/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/922,815

Applicant(s)

MICHALUK ET AL.

Examiner

Andrew L Oltmans

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-30,32-37,39,63,81,83-87,93-101 and 104-188 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-27,63,81,83-87,93-101,104-113 and 115-119 is/are allowed.
- 6) ☒ Claim(s) See Continuation Sheet is/are rejected.
- 7) ☒ Claim(s) 32,33,35,36,114,122,130-132,137,141-143,149,154-156 and 161-163 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6 6) ☐ Other:

Continuation of Disposition of Claims: Claims rejected are 28-30,34,37,39,120,121,123,125-129,133-136,138-140,144-148,150-153,157-160 and 164-188.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The submission under MPEP 724.02 has been acknowledged.

### ***Claim Objections***

2. Applicant is advised that should claim 123 be found allowable, claim 125 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

3. Claim 114 is objected to because of the following informalities:

Applicant appears to have made a typographical error in claim 114, when transposing the claim into the amendment filed September 23, 2002. Claim 114, recites "said log ratio is from greater than about 11.5 to 7.0", wherein it appears that the phrase should have been "said log ratio is from greater than about 1.5 to 7.0". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Instant claims 171-188 are rejected for being indefinite due to the use of the term, "type" in claim 171, in line 1. The addition of the word "type" to an otherwise definite expression

Art Unit: 1742

extends the scope of the expression so as to render it indefinite. Ex parte Copenhaver, 109 USPQ 118 (Bd. App. 1955).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Clark et al. "Influence of Initial Ingot Breakdown on the Microstructural and Textural Development of High-Purity Tantalum", Metallurgical Transactions A, Volume 22A, December 1991, pages 2959-2968 in view of Japanese Patent 06-264232 A 3,260,505***

7. Claims 28-30, 34, 37, 39, 120-121, 123, 125-129, 133-136, 138-140, 144-148, 150-153, 157-160, 164-175, 179 and 183<sup>are</sup> rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. "Influence of Initial Ingot Breakdown on the Microstructural and Textural Development of High-Purity Tantalum", Metallurgical Transactions A, Volume 22A, December 1991, pages 2959-2968 (Clark) in view of Japanese Patent 06-264232 A 3,260,505 (JP '232).

Clark teaches a method of creating a fine-grained, recrystallized tantalum metal (abstract). Clark teaches the fine microstructure tantalum having a texture of  $\{111\}<uvw>$ , substantially devoid of  $\{100\}$  wherein the center peak intensities are encompassed by the instant claims, as recited in instant claims 28, 30, 39, 120, 150, 158 and 171 (page 2964, Table II, Figures on pages 2962, 2963, 2966 and page 2968, CONCLUSION #1 and #5). Clark also teaches that the structure is fully recrystallized, as recited in instant claims 34, 37, 133-136, 145-

Art Unit: 1742

148, 157, 164-167 and 179-182 (page 2967, column 1). Clark further teaches tantalum grain sizes within the ranges instantly claimed, as recited in instant claims 28-29, 120, 138-139, 144, 158, 168-170, 172-173 and 183 (page 2964, Table I).

Clark fails to meet all the limitations of the instant claims in that Clark does not explicitly teach the use of the tantalum metal in sputtering components, sputtering targets or resultant tantalum films or the purity of the tantalum metal.

NOTE: All references in JP '232 are to the abstract or English language translation provided.

JP '232 teaches a method of forming a thin film which has excellent uniformity by forming a target that is of high purity, fine grained, homogenous and recrystallized, as recited in instant claims 28, 120, 121, 126, 128, 150-152, 158, 159 and 171 (abstract and paragraph [0009]). JP '232 teaches that industrially obtained tantalum produces sputtered films that lack homogeneity, which is a "disagreeable" result (paragraph [0007]). To solve the problem, JP '232 teaches that it is desirable to have a Ta sputtering target that is homogeneous with fine grains (paragraph [0009] and [0010]). JP '232 teaches that the purity of the tantalum includes <100ppm total gas impurities, including <50 ppm O, N and C and <10 ppm S and H and metallic impurities no greater than 0.09% (<0.01% Nb, <0.05% W, <0.01% Fe, <0.01% Al and < 0.01% Ni), as recited in instant claims 123, 125, 129, 140, 153, 160 and 175 (paragraph [0014]).

One of ordinary skill in the art at the time that the invention was made would have found the use of the metal in Clark as a sputtering target and subsequent sputtered film obvious because one of ordinary skill in the art would have been motivated to provide a high purity, fine grained, homogenous and recrystallized tantalum metal in JP '232 to provide a desirable (i.e. agreeable)

Art Unit: 1742

homogenous sputtered film, as taught in JP '232 (paragraph [0007], [0009] and [0010]), such as the metal in Clark (abstract).

*Clark et al. "Influence of Initial Ingot Breakdown on the Microstructural and Textural Evelopment of High-Purity Tantalum", Metallurgical Transactions A, Volume 22A, December 1991, pages 2959-2968 in view of Japanese Patent 06-264232 A 3,260,505 further in view of Emigh et al. 5,687,600*

8. Claims 184-188 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. "Influence of Initial Ingot Breakdown on the Microstructural and Textural Evelopment of High-Purity Tantalum", Metallurgical Transactions A, Volume 22A, December 1991, pages 2959-2968 (Clark) in view of Japanese Patent 06-264232 A 3,260,505 (JP '232) further in view of Emigh et al. 5,687,600 (Emigh; cited on IDS filed 8/6/01).

Clark and JP '232 teach as set forth in paragraph 7.

Clark and JP '232 fail to meet all the limitations of the instant claims in that Clark and JP '232 do not explicitly teach a backing plate.

It is noted that claims 184-118 recited the "tantalum sputtering component" (i.e. the tantalum metal component claimed) wherein the component "further comprises a backing plate" (i.e. the claimed metal component having an additional backing plate element not limited by previous limitations, either in material, texture or grain size).

Emigh teaches a tantalum sputtering target assembly, including a backing plate (abstract). Emigh teaches that "[s]puttering target assemblies are typically constructed with the target members supported on a backing member" (col 1, lines 46-47), as recited in claims 184-188.

Art Unit: 1742

One of ordinary skill in the art at the time that the invention was made would have found the invention to be obvious because the target of JP '232 would be used in a typical sputtering apparatus in order to form the thin film taught therein. Because JP '232 would require a typical sputtering apparatus one of ordinary skill in the art would find the use of a backing plate obvious because backing plates are a well-known component of the sputtering apparatus (Emigh: col 1, lines 46-47).

#### ***Response to Amendment***

9. The declaration filed on September 23, 2002 under 37 CFR 1.131 is sufficient to overcome the Shah et al. 6,348,139 reference.
10. The declaration under 37 CFR 1.132 filed September 23, 2002 is sufficient to overcome the rejection of claims 1-43, 63-66, 78-119 based upon Douglass et al. 3,497,402.

#### ***Response to Arguments***

11. The arguments presented in the amendment filed September 23, 2002 have been fully considered. In view of the arguments and the declarations filed, the rejections made in the previous office action have been withdrawn (exclusive of amended claim 28-30, 34, 37 and 39). However, the newly presented claims and amended claims 28-30, 34, 37 and 39 have been rejected under a new ground for rejection in response to the amendment. Claims 1-30, 32-37, 39, 63, 81, 83-87, 93-101, 104-188 remain pending in this application. Because the new grounds for rejection are in response to the amendment filed September 23, 2002, this action is FINAL.



Art Unit: 1742

*Allowable Subject Matter*

12. Claims 32-33, 35-36, 122<sup>124</sup>, 130-132, 137, 141-143, 149, 154-156 and 161-163 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claims 176-178 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

14. Claims 1-27, 63<sup>66</sup>, 81, 83-87, 93-101, 104-113 and 115-119 are allowed. NOTE: Claim 114 is objected to for minor informalities, see paragraph 3, above.

a. A primary reason for allowance of instant claims 1-27, 63<sup>66</sup> and 81 is that the prior art fails to teach or suggest, either alone or in combination, the instantly claimed tantalum metal having a purity of at least about 99.9995% and an average grain size about 75 microns or less.

b. A primary reason for allowance of instant claims 32-33, 35-36, 122<sup>124</sup>, 130-132, 137, 141-143, 149, 154-163, 161-163 and 176-178, under the above conditions, is that the prior art fails to teach or suggest, either alone or in combination, the instantly claimed tantalum metal having the claimed purity.

b. A primary reason for allowance of instant claims 83-87 and 93-97 is that the prior art fails to teach or suggest, either alone or in combination, the instantly claimed tantalum metal having a purity of at least about 99.9995% and an average grain size about 150 microns or less and a uniform primary 111 texture through the thickness of the tantalum metal.

Art Unit: 1742

- c. A primary reason for allowance of instant claims 98-101, 104-113 and 115-119 is that the prior art fails to teach or suggest, either alone or in combination, the instantly claimed tantalum metal having less than 50 ppm metallic impurities and an average grain size about 75 microns or less.

*Conclusion*

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. JP 63119079 A teaches a high purity Ta alloy sintered target for sputtering having a purity of 5-6N Ta and Ti (abstract).

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1742

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew L. Oltmans whose telephone number is 703-308-2594. The examiner can normally be reached 8:30-5:00 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-873-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

*A.O.*

ALO

December 2, 2002

*↖*  
**ROY KING**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 1700**